



Appl. No. 10/787,112

Amendment dated May 7, 2007

Reply to Office Action of February 7, 2007

TSM-35

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listing of claims in the application.

**Listing of Claims:**

1. (Currently Amended) An access restriction information setting method which sets up access restriction information on a storage device, in a storage area network system having the storage device which determines whether or not an access request to a volume is permitted in accordance with access restriction information which is set up on a port which receives the request, and a plurality of host computers which transmits an access requests to said storage device through a first network, comprising:

a first step for obtaining first access restriction information and information of a volume which are set up on each port of a first storage device, through a second network, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer;

a second step for obtaining attribute information including a port type and a status of utilization of each port of a second storage device, from said second storage device through said second network;

a third step for selecting a port of said second storage device which is utilized for an access to a volume of said first storage device, on the basis of attribute

~~information of each port that said second storage device has, which is obtained in said second step~~ a target port which is utilized for reception of an access request to a volume of said first storage device from said first host computer; and

~~a fourth step for setting up, on a port of said second storage device which is selected in said third step, access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned, on the basis of access restriction information and information of a volume of each port that said first storage device has, which are obtained in said first step~~ on the target port of said second storage device which is selected in said third step, second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device.

2. (Currently Amended) An access restriction information setting method according to Claim 1, wherein

~~said third step selects a target port which is utilized for reception of an access request to a volume that said first storage device has from said host computer, and an initiator port which is utilized for transmission of an access request to a volume of~~ that said first storage device has from said second storage device, and

said fourth step sets up, on thea target port of said second storage device which is selected in said third step, the second access restriction information of thea port of said first storage device to which athe volume, of which the port is utilized for an access, is assigned, and permits only an access request to the first access restriction information of said first storage device to which the volume is assigned from anthe initiator port of said second storage device which is selected in said third step.

3. (Currently Amended) An access restriction information setting method according to Claim 1, wherein

    said first step obtains the first access restriction information which is set up on each port ofthat a first storage device has-and information of a volume, from said first storage device through said second network.

4. (Currently Amended) An access restriction information setting method according to Claim 1, wherein

    said first step specifies the first access restriction information which is set up on each port ofthat a first storage device has-and information of thea volume, by obtaining information of a port of one of said host computers which is utilized for an access to thea volume ofthat said first storage device has and information of athe

port of said first storage device, from said one of said host computers through said second network.

5. (Original) An access restriction information setting method according to Claim 1, further comprising:

a fifth step for changing a port of said first storage device which is associated with each mount point of a file system of said host computer and a volume which is assigned to the port, to a port of said second storage device which is utilized for an access to the volume and a volume which is defined on the port.

6. (Currently Amended) An access restriction information setting method according to Claim 1, wherein

    | said first storage device sets up first access restriction information on each port, by use of a first management table in which an information identifier of a volume and a source port of an access to be permitted are listed with a LUN unit with respect to each port, and

    | said second storage device sets up second access restriction information on each port, by use of a second management table in which a LUN and an identifier of a volume are listed with a group unit of source ports of an access to be permitted with respect to each port, and

    | said first step obtains said first management table, and

said fourth step prepares said second management table as to each port of said second storage device which is selected in said third step, on the basis of a listed content of said first management table which is obtained in said first step as to each port of said first storage device to which a volume, of which said port is utilized for an access, is assigned, and updates said second management table of that said second storage device has.

7. (Currently Amended) An access restriction information setting method according to Claim 1, wherein

in case that one of said host computers has a plurality of paths which are used for an access to the same volume, a process of said fourth step to the volume is carried out at least twice separately to said plurality of paths.

8. (Original) An access restriction information setting method according to Claim 1, wherein

said second network is different from said first network.

9. (Currently Amended) An access restriction information setting apparatus which sets up access restriction information on a storage device, in a storage area network system having the storage device which determines whether or not an access request to a volume is permitted in accordance with access restriction information

which is set up on a port which receives the request, and in a plurality of host computers which transmits an access requests to said storage device through a first network, comprising:

an obtaining unit which obtains first access restriction information and information of a volume which are set up on each port of a first storage device, and attribute information including a port type and a status of utilization of each port of a second storage device, through a second network, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer;

a selecting unit which selects a target port which is utilized for reception of an access request to a volume of said first storage device from said host computer ~~a port of said second storage device which is utilized for an access to a volume of said first storage device, on the basis of attribute information of each port that said second storage device has, which is obtained in said obtaining unit~~; and

a setting unit which sets up, on the target port of said second storage device which is selected in said selecting unit, second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device ~~on a port of said second storage device which is selected in said selecting unit, access restriction information of a port of said first storage device to~~

~~which a volume, of which the port is utilized for an access, is assigned, on the basis of access restriction information and information of a volume of each port that said first storage device has, which are obtained in said obtaining unit.~~

10. (Currently Amended) An access restriction information setting system having first and second storage devices which determine whether or not an access request to a volume is permitted in accordance with access restriction information which is set up on a port which receives the request, a plurality of host computers which transmits an access requests to said first and second storage devices through a first network, and an access restriction information setting device which is connected to said first and second storage devices through a second network, wherein

said access restriction information setting device comprising:

an obtaining unit which obtains first access restriction information and information of a volume which are set up on each port of said first storage device, and attribute information including a port type and a status of utilization of each port of said second storage device, through a second network, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer;

selecting unit which selects a target port which is utilized for reception of an access request to a volume of said first storage device from said host computer a port of said second storage device which is utilized for an access to a volume of said first

~~storage device, on the basis of attribute information of each port of said second storage device, which is obtained in said obtaining unit; and~~

~~setting unit which sets up, on the target port of said second storage device which is selected in said selecting unit, second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device~~  
~~on a port of said second storage device which is selected in said selection unit, access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned, on the basis of access restriction information and information of a volume of each port that said first storage device has, which are obtained in said obtaining unit.~~

11. (Currently Amended) A computer-readable program for setting access restriction information on a storage device, in a storage area network system having the storage device which determines whether or not an access request to a volume is permitted in accordance with access restriction information which is set up on a port which receives the request, and a plurality of host computers which transmits ~~an~~ access requests to said storage device through a first network, wherein said program causes a computer to execute:

a first step for obtaining first access restriction information and information of a volume which are set up on each port of a first storage device, through a second network, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer;

a second step for obtaining attribute information including a port type and a status of utilization of each port of a second storage device, from said second storage device through said second network;

a third step for selecting a target port which is utilized for reception of an access request to a volume of said first storage device from said host computer port of said second storage device which is utilized for an access to a volume of said first storage device, on the basis of attribute information of each port of said second storage device, which is obtained in said second step; and

a fourth step for setting up, on the target port of said second storage device which is selected in said third step, second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device on a port of said second storage device which is selected in said third step, access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned, on the basis of access

~~restriction information and information of a volume of each port that said first storage device has, which are obtained in said first step.~~

12. (Currently Amended) An access restriction information setting method in which, in a storage area network system having a storage device which determines whether or not an access request to a volume is permitted in accordance with access restriction information which is set up on a port which receives the request, and a plurality of host computers which transmits an access requests to said storage device through a first network, an access restriction information setting device which is connected to said storage device through a second network sets up access restriction information on said storage device, wherein

said access restriction information setting device:

obtains first access restriction information and information of a volume which are set up on each port of a first storage device, through said second network, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer,

obtains attribute information including a port type and a status of utilization of each port of a second storage device, from said second storage device through said second network,

selects a target port which is utilized for reception of an access request to a volume of said first storage device from said host computer port of said second

~~storage device which is utilized for an access to a volume of said first storage device, on the basis of attribute information of each port of said second storage device, which is obtained as above, and~~

~~sets up, on the target port of said second storage device which is selected in said selecting step, second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device on a port of said second storage device which is selected as above, access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned, on the basis of access restriction information and information of a volume of each port that said first storage device has, which are obtained as above.~~

13. (Currently Amended) An access restriction information setting apparatus which sets up access restriction information on a storage device, in a storage area network system having the storage device which determines whether or not an access request to a volume is permitted in accordance with access restriction information which is set up on a port which receives the request, and a plurality of host computers which transmits an access requests to said storage device through a first network, comprising:

a network I/F unit which is utilized for connecting to said second network, and a calculation unit,

wherein, said calculation unit:

obtains first access restriction information and information of a volume which are set up on each port of a first storage device, from said first storage device and attribute information including a port type and a status of utilization of each port of a second storage device, from said second storage device, through said network I/F unit, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer,

selects, as the port of the second storage, a target port which is utilized for receiving an access request from said host computer to a volume of said first storage device selects a port of said second storage device which is utilized for an access to a volume of said first storage device, on the basis of attribute information of each port of said second storage device, which is obtained as above, and

sets up second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device sets up, on a port of said second storage device which is selected as above, through said network I/F unit, access restriction information of a port of said first

~~storage device to which a volume, of which the port is utilized for an access, is assigned, on the basis of access restriction information and information of a volume of each port that said first storage device has, which are obtained as above.~~

14. (Currently Amended) An access restriction information setting system having first and second storage devices which determine whether or not an access request to a volume is permitted in accordance with access restriction information which is set up on a port which receives the request, a plurality of host computers which transmits an access requests to said first and second storage devices through a first network, and an access restriction information setting device which is connected to said first and second storage devices through a second network, wherein said access restriction information setting apparatus has a network I/F unit which is utilized for connecting to said second network, and a calculation unit, and said calculation unit:

obtains first access restriction information and information of a volume which are set up on each port of said first storage device, and attribute information including a port type and a status of utilization of each port of said second storage device, from said second storage device, through said network I/F unit, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer,

selects a target port which is utilized for reception of an access request to a volume of said first storage device from said host computer~~port of said second storage device which is utilized for an access to a volume of said first storage device, on the basis of attribute information of each port of said second storage device, which is obtained as above,~~ and

sets up, on the target port of said second storage device which is selected in said selecting step, second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device~~on a port of said second storage device which is selected as above, through said network I/F unit, access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned, on the basis of access restriction information and information of a volume of each port that said first storage device has, which are obtained as above.~~

15. (Currently Amended) An access restriction information setting system having first and second storage devices which determine whether or not an access request is permitted to a volume in accordance with access restriction information which is set up on a port which receives the request, a plurality of host computers which transmits an access requests to said first and second storage devices, a Fibre

Channel switch which configures a Fibre Channel network which connects between said first and second storage devices and said host computers, a management server which sets up access restriction information on said first and second storage devices, and a LAN which connects between said first and second storage devices and said management server, wherein

    said first and second storage devices have a FC I/F which connects to said Fibre Channel switch, and

    said management server

    has a LAN I/F unit which is utilized for connecting to said LAN, and a calculation unit, and

    said calculation unit:

    obtains first access restriction information and information of a volume which are set up on each port of the FC I/F of said first storage device has from said first storage device, and attribute information including a port type and a status of utilization of each port of the FC I/F of said second storage device, from said second storage device, through said LAN I/F unit, said first access restriction information including information of access permission from a first host computer and access denial from a second host computer,

    selects a target port of a FC I/F of said second storage device which is utilized for an access to a volume of said first storage device, on the basis of attribute

information of each port of the FC I/F ofthat said second storage device has, which is obtained as above, and

sets up, on the target port of the FC I/F of said second storage device which is selected in said selecting step, second access restriction information based on said first access restriction information of a port of said first storage device to which a volume, of which the port is utilized for an access, is assigned so that said second host computer may not access said first storage device via said second storage device on a port of the FC I/F of said second storage device which is selected as above through said LAN I/F unit, access restriction information of a port of the FC I/F of said first storage device to which a volume, of which the port is utilized for an access, is assigned, on the basis of access restriction information and information of a volume of each port of the FC I/F that said first storage device has, which are obtained as above.

16. (Canceled).

17. (Currently Amended) An access restriction information setting apparatus according to claim 13, wherein

said calculation unit specifies the first access restriction information which is set up on each port ofthat said first storage device has and information of the a volume, by obtaining a port of one of said host computers which is utilized for an

access to thea volume ofthat said first storage device has and information of thea port of said first storage device, from said one host computer through said second network.

18. (Original) An access restriction information setting apparatus according to claim 13, wherein

said calculation unit  
changes a port of said first storage device which is associated with each mount point of a file system of said host computer and a volume which is assigned to the port, to a port of said second storage device which is utilized for an access to the volume and a volume which is defined on the port.

19. (Currently Amended) An access restriction information setting apparatus according to claim 13, wherein

said first storage device sets up the first access restriction information on each port, by use of a first management table on which an information identifier of a volume and a source port of an access to be permitted are listed with a LUN unit with respect to each port, and

said second storage device sets up the second access restriction information on each port, by use of a second management table on which a LUN and an

identifier of a volume are listed with a group unit of source ports of an access to be permitted with respect to each port, and

said calculation unit

obtains said first management table, and prepares said second management table as to each port of said second storage device which is selected as above, on the basis of a listed content of said first management table, and updates said second management table of which said second storage device has.

20. (Currently Amended) An access restriction information setting apparatus according to claim 13, wherein

in a case that said host computers have a plurality of paths which are used for an access to the same volume, a process of setting up said access restriction information to a volume is carried out at least twice separately to said plurality of paths.